

# Multidiciplinary Approach to Carotid Body Paraganglioma: Preoperative Percutaneous Embolization and Surgical Resection

## Karotid Cisim Paragangliomasına Multidisipliner Yaklaşım: Preoperatif Perkütan Embolizasyon ve Cerrahi Rezeksiyon

ALİ FIRAT\*, CÜNEYT AYTEKİN\*, FATİH BOYVAT\*, NUR ALTINÖRS\*\*,  
MURAD BAVBEK\*\*, ATILAY TAŞDELEN\*\*\*

Başkent University Faculty of Medicine, Departments of Radiology\* (AF, CA, FB),  
Neurosurgery\*\* (NA, MB) and Vascular Surgery\*\*\* (AT), Ankara

Received: 24.01.2003 ⇨ Accepted: 26.05.2003

**Abstract:** This report describes a case of 28-year-old female with direct percutaneous embolization of a carotid body paraganglioma followed by surgical excision of the lesion. Preoperative angiographic embolization of such tumors has reduced intraoperative blood loss significantly and has caused shrinkage in tumor size. Multidisciplinary approach is very important to such pathologies. Direct percutaneous embolization provides much more important devascularization than endovascular embolization.

**Key Words:** Carotid body, paraganglioma, percutaneous embolization

**Özet:** Bu çalışmada karotid cisim paraganglioması nedeni ile direkt perkütan embolizasyon yapılan ve daha sonra lezyonu cerrahi olan çıkarılan 28 yaşındaki bayan olgu sunulmaktadır. Bu tip tümörlerde preoperatif anjiyografik embolizasyon intraoperatif kan kaybını azaltmakta ve tümör boyutunda küçülmeye neden olmaktadır ve multidisipliner yaklaşım bu patolojilerde çok önemlidir. Direkt perkütan embolizasyon endovasküler embolizasyondan daha önemli derecede devaskülarizasyon sağlamaktadır.

**Anahtar Kelimeler:** Karotid cisim, paraganglioma, perkütan embolizasyon

### INTRODUCTION

Carotid body paragangliomas are rare and generally benign tumors that grow slowly, usually occurring between the fourth and the sixth decades of life (2). Glomus tumors arise from rests of paraganglionic tissue of neural crest origin known as glomus bodies (7). Total resection of the carotid body paragangliomas is the best curative treatment

but postoperative bleeding, stroke and injury to cranial nerves may accompany total resection (7). Preoperative embolization decreases the blood supply to highly vascularized tumors and it provides the surgeon with much comfort and safety in removing the tumor with low morbidity (4). Multidisciplinary approach is very important in the treatment of such pathologies. The purpose of this study is to demonstrate how

multidisciplinary approach has resulted in excellent prognosis in a case of a carotid body paraganglioma.

### CASE REPORT

A 28-year-old female complained of a swelling on her right side of the face, which she had first realized three years previously and which had grown in the meantime. There was no history of trauma. The physical examination revealed a mass with 3 cm diameter below the right mandibula and lateral to the midline. The mass was pulsatile, fairly mobile, and painful and murmur was heard over the mass. The neurologic examination was normal. A computed tomography of the neck revealed a hypervascular mass of about 3x3 cm between the right internal carotid artery (ICA) and the external carotid artery (ECA). Diagnostic angiograms showed that the lesion was hypervascular and between the origins of right external and internal carotid arteries (Figure 1).

First, superselective intraarterial embolization with polyvinyl alcohol particles (PVA, Boston scientific, USA) was performed but this procedure was not successful because the tumor was highly vascular. Seldinger needle was inserted into the centrum of the lesion and contrast agent was injected and paranchymography was performed under fluoroscopy (Figure 2). There was no reflux of the

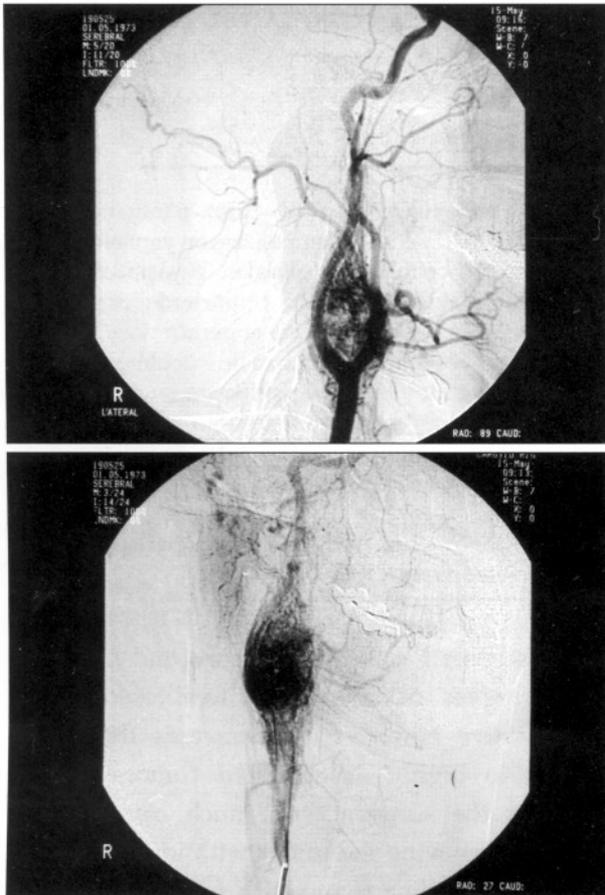


Figure 1. Early arterial (a) and late arterial (b) angiograms showed that the highly vascular lesion was between the origins of right external and internal carotid arteries.



Figure 2. After the insertion of Seldinger needle into the centrum of the lesion contrast agent was injected into the tumor and paranchymography was performed under fluoroscopy.

intracranial arterial vessels. Then, the lesion was embolized percutaneously with N-butylcyanoacrylate and lipiodol (Guerbet France, Paris, France) mixture under ultrasound and fluoroscopy guidance. The control angiographies confirmed complete embolization of the lesion (Figure 3).

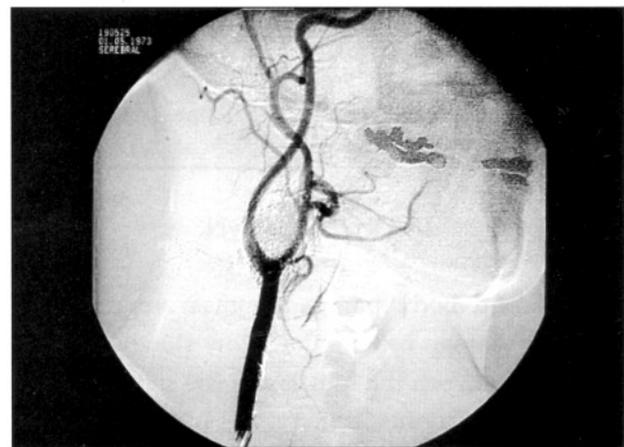


Figure 3. The control angiography after direct percutaneous embolization revealed complete embolization of the lesion.

No complication related to the embolization was observed. The patient was operated on May 17, 2001 by neurosurgery and cardiovascular teams. The right CCA, ICA and ECA were identified. The tumor was gently dissected from these vessels and removed totally. There was no bleeding either from the tumor or from the normal vasculature. The postoperative period was uneventful. The histopathological diagnosis was carotid body tumor. Immunohistochemical studies revealed that the tumor cells were positive with S-100 antibody while negativity was observed with actin antibody.

## DISCUSSION

The primary treatment of carotid body paraganglioma is surgical excision, but radiotherapy is given in cases of confirmed malignancy or partially resectable lesions(7). Carotid body tumors may bleed profusely preoperatively due to their highly vascular structure (5). Preoperative angiographic embolization of hypervascular tumors has reduced intraoperative blood loss significantly and has resulted in shrinkage of tumor size (3,7). The advantages of the embolization to the surgeon include improved tumor visualization and ease of dissection (7). Embolization of the feeding pedicles is performed commonly in highly vascularized tumors (6). Most hypervascular head and neck tumors are supplied by branches of the external carotid artery, which are easily accessible with selective embolization (1). However, complete filling of the vascular bed of the tumor may not be possible with endovascular embolization due to high vascularity and feeding of both of the arteries (1,4). The most significant potential complication of superselective embolization (SSE) is stroke. This may occur from reflux to embolic material from the external carotid artery system into the internal carotid artery or vertebral system via collaterals. Cranial nerve palsies have been also reported during SSE (7). The cause of such palsies is edema to secondary nerve compression or embolic material traveling distally into the vaso nervosa (7). Direct percutaneous intratumoral embolization allows the complete filling of the embolizant agent's vascular bed of the tumor. Additionally

intratumoral embolization provides much more important devascularization than endovascular embolization (1). This technique facilitates access to tumor and decreases the risk of certain embolizations (1). The only potential risk of intratumoral embolization with NBCA is reflux of this agent into the ICA vertebral arteries via feeders. This complication is avoided by slow injection of NBCA under fluoroscopy (1).

The intratumoral embolization technique is a simple and safe technique and avoids reflux in the arterial feeders. This is particularly important for intracranial tumors (1,4).

In this case study we would like to emphasize the importance and need of multidisciplinary approach to such pathologies. Such an attitude results in good clinical prognosis. The contribution of radiology department has been twofold; the lesion was diagnosed by angiography and 3-D tomography along with information about the feeder vessels, thus giving the surgical team necessary information. Further help has been embolization of the pathology, thus contributing to therapy. The surgical team has been safe with a completely embolized lesion. The risk of damage to main vessels and its consequent neurologic complications requires the cooperation of neuro and vascular surgeons. The kind of surgery should not be regarded solely as manipulation of these vessels.

**Correspondence :** Ali Firat, M.D.  
Başkent University Faculty of  
Medicine Departments of Radiology  
Fevzi Çakmak Cad. 10. Sok. No: 45  
06490 Bahçelievler, Ankara-Turkey  
Fax : 90 312 2237333  
Phone: 90 312 2126868/1015  
E-mail: alifiratdr@hotmail.com

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